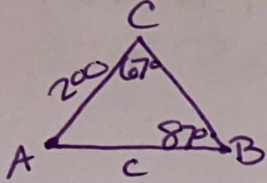**Draw a picture, label, and solve each problem below.**

1. Points A an B are on opposite sides of the Grand Canyon. Point C is 200 yards from A. Angle B measures 87° and angle C measures 67°. What is the distance between A and B?

$$184.4 \text{ yds}$$

$$\frac{200}{\sin 87°} = \frac{C}{\sin 67°}$$

2. Two observers are standing on shore ½ mile apart at points A and B and measure the angle to a sailboat at a point C at the same time. Angle A is 63° and angle B is 56°. Find the distance from each observer to the sailboat.
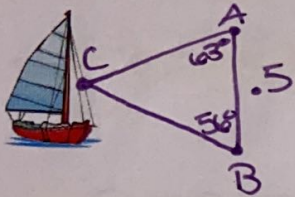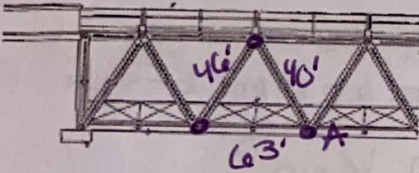

$$a = .51 \text{ miles} \qquad b = .47 \text{ miles}$$

$$\frac{a}{\sin 63} = \frac{.5}{\sin 61} \qquad \frac{b}{\sin 56} = \frac{.5}{\sin 61}$$

3. A bridge is supported by triangular braces. If the sides of each brace have lengths 63 feet, 46 feet and 40 feet, find the measure of the angle opposite the 46 ft side.

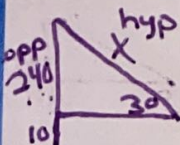$$46^2 = 40^2 + 63^2 - 2(40)(63)\cos A$$

$$A = 46.8°$$

4. On a map, Orlando is 178 mm due south of Niagara Falls, Denver is 273 mm from Orlando, and Denver is 235 mm from Niagara Falls. Find the angle formed from Niagara Falls to Denver and Orlando.
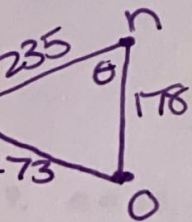
$$(273)^2 = (235)^2 + (178)^2 - 2(235)(178)\cos n$$

$$n = 81.5°$$

5. Nancy shines a light from a window of a light house on a cliff 250 feet above the water level. Nick Danger 10 feet above the water level in a ship offshore, finds that the angle of elevation of the light is 3°. Find the length of the line of light (light beam) from the ship to Nancy. Round to the nearest tenth.

$$\sin 3° = \frac{240}{x}$$

$$x = 4,585.8 \text{ ft}$$

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